FORM PTO-1390
(REV 10-94)

US DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

DOCKET #: 4925-187PUS

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING
UNDER 35 U.S.C. 371

	U.S. APPLICATION NO. (If known, see 37 CFR 1.5)
	10/018584

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/04495	**29 June 1999**	**29 June 1999**

TITLE OF INVENTION

Power Control Method and Device

APPLICANT(S) FOR DO/EO/US

Mika RAITOLA

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [x] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371
3. [ ] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [ ] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date
5. [x] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   - a. [x] is transmitted herewith (required only if not transmitted by the International Bureau).
   - b. [x] has been transmitted by the International Bureau.
   - [ ] is not required, as the application was filed in the United States Receiving Office (RO/US)
6. [ ] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [x] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   - a. [x] are transmitted herewith (required only if not transmitted by the International Bureau) (See Reply to Written Opinion)
   - b. [ ] have been transmitted by the International Bureau.
   - c. [ ] have not been made, however, the time limit for making such amendments has NOT expired.
   - d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [x] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). **Unexecuted**
10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5))

Items 11. to 16. Below concern other document(s) or information included:
11. [x] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3 31 is included.
13. [x] A **FIRST** preliminary amendment.
    [ ] A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [x] Other items or information *(specify)* PCT Publication Sheet, Int'l Preliminary Examination Report, PCT Request, Written Opinion, Reply to Written Opinion, Information Concerning Elected Offices Notified of Their Election, Notice Informing the Applicant of the Communication of the International Application to the Designated Offices, Notice of the Recording of a Change, and Notification of Receipt of Record Copy

U.S. APPLICATION NO. (if known see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
10/01...	PCT/EP99/04495	4925-187PUS

7. [x] The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(1)-(5)):
Search Report has been prepared by the EPO or JPO $890.00
International preliminary examination fee paid to USPTO (37 CFR 1 482) $710.00
No international preliminary examination fee paid to USPTO (37 CFR 1.482)
but international search fee paid to USPTO (37 CFR 1 445(a)(2)) $740.00
Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37 CFR 1 445(a)(2)) paid to USPTO $1040.00
International preliminary examination fee paid to USPTO (37 CFR 1.482)
and all claims satisfied provisions of PCT Article 33(2)-(4) $100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =	$	890

Surcharge of **$130.00** for furnishing the oath or declaration later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(e)). $

Claims	Number Filed	Number Extra	Rate		
Total Claims	48 - 20 =	28	x **$18.00**	$	504
Independent Claims	2 - 3 =	0	x **$84.00**	$	
Multiple dependent claim(s) (if applicable)			+ **$280.00**	$	
TOTAL OF ABOVE CALCULATIONS =				$	1394
Reduction of ½ for filing by small entity, if applicable.				$	
SUBTOTAL =				$	1394

Processing fee of **$130.00** for furnishing the English translation later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).   + $

TOTAL NATIONAL FEE =	$ 1394

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by the appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property   + $

TOTAL FEES ENCLOSED	$1394
Amount to be refunded:	$
charged:	$

a. [x] One check in the amount of $ 1394 to cover the above fee is enclosed.

b. [] Please charge my Deposit Account No. 03-2412 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [x] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 03-2412. A duplicate copy of this sheet is enclosed

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.
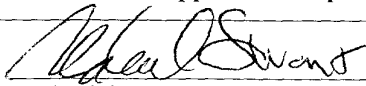
SEND ALL CORRESPONDENCE TO
Michael C. Stuart
Cohen, Pontani, Lieberman & Pavane
551 Fifth Avenue, Suite 1210
New York, New York 10176

Michael C. Stuart
Registration Number: 35,698   December 13, 2001
Tel: (212) 687-2770

Attorney Docket # 4925-187PUS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Phase PCT Application of

Mika RAITOLA

International Appln. No.:   PCT/EP99/04495

International Filing Date: 29 June 1999

For: Power Control Method and Device

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231
BOX PCT

S I R:

Prior to examination of the above-identified application please amend the

application as follows:

In the Specification:

On page 11, line 1, delete "Claims", and insert therefor --What is claimed is:--.

In the Claims:

Amend claims 7, 8, 9, 16, 17, and 18 to read as follows:

-1-

7.   A method according to claim 1, wherein said method is performed by at least one of said terminal device (TD) and said transceiver station (BTS).

8.   A method according to claim 1, wherein said method is performed in downlink direction.

9.   A method according to claim 1, wherein said method is performed in uplink direction.

16.   A device according to claim 10, wherein said device is included by at least one of said terminal device (TD) and said transceiver station (BTS).

17.   A device according to claim 10, wherein said device is adapted to perform a power control in downlink direction.

18.   A device according to claim 10, wherein said device is adapted to perform a power control in uplink direction.

Add the following new claims:

19.   A method according to claim 2, wherein said method is performed by at least one of said terminal device (TD) and said transceiver station (BTS).

20.   A method according to claim 3, wherein said method is performed by at least one of said terminal device (TD) and said transceiver station (BTS).

21.   A method according to claim 4, wherein said method is performed by at least one of said terminal device (TD) and said transceiver station (BTS).

22.   A method according to claim 5, wherein said method is performed by at least one of said terminal device (TD) and said transceiver station (BTS).

23.   A method according to claim 6, wherein said method is performed by at least one of said terminal device (TD) and said transceiver station (BTS).

24.   A method according to claim 2, wherein said method is performed in downlink direction.

25.   A method according to claim 3, wherein said method is performed in downlink direction.

26.   A method according to claim 4, wherein said method is performed in downlink direction.

27.   A method according to claim 5, wherein said method is performed in downlink direction.

28.   A method according to claim 6, wherein said method is performed in downlink direction.

29.   A method according to claim 2, wherein said method is performed in uplink direction.

30.   A method according to claim 3, wherein said method is performed in uplink direction.

31.   A method according to claim 4, wherein said method is performed in uplink direction.

32.   A method according to claim 5, wherein said method is performed in uplink direction.

33.   A method according to claim 6, wherein said method is performed in uplink direction.

34.   A device according to claim 11, wherein said device is included by at least one of said terminal device (TD) and said transceiver station (BTS).

35.   A device according to claim 12, wherein said device is included by at least one of said terminal device (TD) and said transceiver station (BTS).

36.   A device according to claim 13, wherein said device is included by at least one of said terminal device (TD) and said transceiver station (BTS).

37.   A device according to claim 14, wherein said device is included by at least one of said terminal device (TD) and said transceiver station (BTS).

38.   A device according to claim 15, wherein said device is included by at least one of said terminal device (TD) and said transceiver station (BTS).

39.   A device according to claim 11, wherein said device is adapted to perform a power control in downlink direction.

40.   A device according to claim 12, wherein said device is adapted to perform a power control in downlink direction.

-5-

41. A device according to claim 13, wherein said device is adapted to perform a power control in downlink direction.

42. A device according to claim 14, wherein said device is adapted to perform a power control in downlink direction.

43. A device according to claim 15, wherein said device is adapted to perform a power control in downlink direction.

44. A device according to claim 11, wherein said device is adapted to perform a power control in uplink direction.

45. A device according to claim 12, wherein said device is adapted to perform a power control in uplink direction.

46. A device according to claim 13, wherein said device is adapted to perform a power control in uplink direction.

47. A device according to claim 14, wherein said device is adapted to perform a power control in uplink direction.

48.   A device according to claim 15, wherein said device is adapted to perform a power control in uplink direction.

REMARKS

This preliminary amendment is presented to place the application in proper form for examination and to eliminate multiple dependency from the present claims. No new matter has been added. Early examination and favorable consideration of the above-identified application is earnestly solicited.

Any additional fees or charges required at this time in connection with the application may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,
COHEN, PONTANI, LIEBERMAN & PAVANE

By: _____
Michael C. Stuart
Reg. No. 35,698
551 Fifth Avenue, Suite 1210
New York, N.Y. 10176
(212) 687-2770

13 December 2001

AMENDMENTS TO THE SPECIFICATION AND CLAIMS SHOWING CHANGES

In the Claims:

7.   A method according to claim 1 [to 6], wherein said method is performed by at least one of said terminal device (TD) and said transceiver station (BTS).

8.   A method according to claim 1 [to 6], wherein said method is performed in downlink direction.

9.   A method according to claim 1 [to 6], wherein said method is performed in uplink direction.

16.   A device according to claim 10 [to 15], wherein said device is included by at least one of said terminal device (TD) and said transceiver station (BTS).

17.   A device according to claim 10 [to 15], wherein said device is adapted to perform a power control in downlink direction.

18.   A device according to claim 10 [to 15], wherein said device is adapted to perform a power control in uplink direction.

-1-

- 1 -

POWER CONTROL METHOD AND DEVICE

FIELD OF THE INVENTION

5   The present invention relates to a method for controlling a
power used for transmitting data between a terminal device
and a transceiver device of a communication system and also
to a corresponding device. In particular, the present
invention is directed to a power control method and
10   corresponding device used in Code Division Multiple Access
(CDMA) systems.

BACKGROUND OF THE INVENTION

15   In recent years, mobile radio telecommunication systems
have widely spread. Such mobile radio telecommunication
systems (for example GSM, 3rd generation system such as the
Universal Mobile Telecommunications System (UMTS) and
others) operate with different data transmission methods.
20   Such a data transmission method is for example a Code
Division Multiple Access (CDMA) method. Said CDMA method is
further developed into a Wideband Code Division Multiple
Access (WCDMA) method (or Broadband CDMA) using a greater
frequency band for example to be used in 3rd generation
25   communication systems like the UMTS.

In both CDMA and WCDMA methods, the basic operating
principle is similar. Data to be transmitted between
terminal devices such as mobile stations via a
30   communication network comprising several network elements
such as transceiver devices such as base transceiver
stations, mobile switching centers and the like is
multiplied with a unique code allocated to each connection.
Said code has a higher frequency than the data which
35   results in a wide transmission bandwidth in comparison with

the original data bandwidth. This process is also known as spreading.

On a receiving side knowing the respective code, the
5 transmitted signal is decoded and the recovered data is processed further. This process is also known as despreading.

For a correct recovery of the data from the transmitted
10 signal a major condition is that the received signals have a (nearly) constant and equal strength. Since in a mobile telecommunication system, for example due to a movement of the terminal devices, widely different signal strengths may be received when transmitting always with the same
15 transmission power, interference between different terminal devices transmitting at the same time may occur. Therefore, an accurate power control in uplink (terminal device to transceiver station) and downlink (transceiver station to terminal device) is required.
20

In third generation CDMA systems (e.g. cdma2000, WCDMA) fast power control is used both in uplink and downlink. Here, the decoding performance is optimal when the received signal power is as constant as possible. This is required
25 especially when the service delay is limited (for example in speech communication) and a fading may cause errors. The fast power control is able to follow even fast fadings.

On the other hand, the downlink transmission capacity is
30 maximized when the transmitted power is minimized, i.e. the generated interference is as low as possible. However, fast power control aims that the received power is constant. This means that the transmitted power varies greatly, which increases the transmitted power average. Also, the
35 variation of transmitted power causes power spikes which are harmful for system load control.
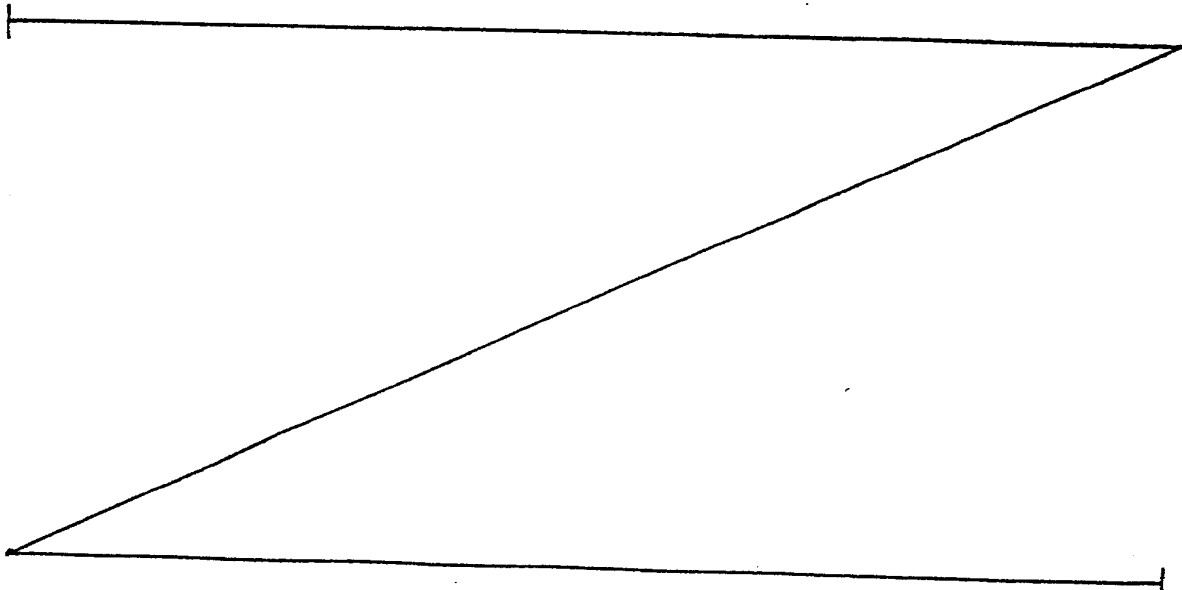
ART 34 AMDT

However, in case of e.g. a packet data service, a
retransmission protocol is included. This means that a loss
of data, for example due to decoding problems, would not
5 cause absolute errors but only lead to a retransmission.
This allows a packet data power control not to follow every
fade, but to compensate fades by retransmissions.

When using a slower power control occurrence of high
10 interference spikes as in the fast power control can be
prevented. However, slower power control works poorly for
delay limited services as it can not follow fast fading of
the signal.

15 In document EP-A-0 682 417, a transmission power control
method of a spread spectrum communication system is
disclosed which determines transmission power in accordance
with a transmission power control (TPC) bit.

20 In document EP-A-0 682 419, a transmission power control
method is disclosed which uses an open or a closed loop
control in dependence on changes in the desired received
signal level at the mobile station.

- 3 A -

~~However, in case of e.g. a packet data service, a~~
retransmission protocol is included. This means that a loss
of data, for example due to decoding problems, would not
5   cause absolute errors but only lead to a retransmission.
This allows a packet data power control not to follow every
fade, but to compensate fades by retransmissions.

When using a slower power control occurrence of high
10 interference spikes as in the fast power control can be
prevented. However, slower power control works poorly for
delay limited services as it can not follow fast fading of
~~the signal.~~

15 SUMMARY OF THE INVENTION

Consequently, it is an object of the present invention to
provide ~~a~~ an improved method and a corresponding device for controlling
a power used for transmitting data between a terminal
20 device and a transceiver device of a communication system.

According to the present invention, this object is achieved
by a method for controlling a power used for transmitting
data between a terminal device and a transceiver device of
25 a communication system, said method comprising the steps of
monitoring during a predetermined time unit the power used
in a transmission between said terminal device and said
transceiver device, requesting an increase or a decrease of
the power used in the transmission by using a specific
30 information element for each predetermined time unit,
storing a predetermined number of said specific information
elements, calculating a first value and a second value
concerning the power of transmission during said
predetermined number of said specific information elements,
35 and deciding by using the first value and the second value
concerning the power calculated in said calculating step,

AMENDED SHEET   → p 4

whether the first value concerning the power is greater
than a sum of the second value concerning the power and a
predetermined level.

5   Furthermore, the present invention proposes a device for
controlling a power used for transmitting data between a
terminal device and a transceiver device of a communication
system, said device comprising monitoring means for
monitoring during a predetermined time unit the power used
10 in a transmission between said terminal device and said
transceiver device, requesting means for requesting an
increase or a decrease of the power used in the
transmission by using a specific information element for
each predetermined time unit, storing means for storing a
15 predetermined number of said specific information elements,
calculating means for calculating a first value and a
second value concerning the power of transmission during
said predetermined number of said specific information
elements, and deciding means for deciding by using the
20 first value and the second value concerning the power
calculated by said calculating means, whether the first
value concerning the power is greater than a sum of the
second value concerning the power and a predetermined
level.
25

Advantageous further developments of the present invention
are as set out in the respective dependent claims.

According to the present invention, the proposed method
30 and/or device are easy to implement since only small
changes to present systems are necessary.

Furthermore, for example a downlink power control according
to the present invention is able to maximize the decoding
35 performance by following fading as well as possible and
also to minimize the interference caused to the other

terminal devices. It is possible to follow even fast fading as in the fast power control, but if the requested power raise within a predetermined time is to high a corresponding high increase of the transmission power is
5   prevented. Moreover, excessively high power spikes are inhibited and therefore the performance of the system load control can be improved.

Preferred embodiments of the invention are described herein
10   below in detail by way of example with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

15   FIG. 1 shows a flowchart illustrating the method according to the present invention.

FIG. 2 shows a block circuit diagram illustrating an embodiment of the device according to the present
20   invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

In the following, as a first example, the above mentioned
25   downlink case is described.

With reference to FIG. 1, a power control method according to the present invention is illustrated in the flowchart.

30   In step S1, the power control is started, for example when a packet data communication connection is established between two terminal devices TD via a communication network (i.e. via at least one base transceiver station BTS). During the communication, the signal strength (i.e. the
35   transmission power) from the base transceiver station BTS is frequently monitored in each timeslot by the terminal

device TD (step S2). If necessary, i.e. when the signal strength changes above or below a predetermined value, in step S3, the terminal device TD requests an increase or decrease of the transmission power of the base transceiver
5 station, respectively.

This request is represented by specific information elements or commands which are known as so-called transfer power control bits TPC. Said TPC bits have a value of +1 if
10 an increase of power by a predetermined level is requested and a value of -1 if a decrease of power by a predetermined level is requested. For each time unit, one TPC bit is sent. Said time unit is for example one timeslot or a frame consisting of a plurality of timeslots.
15

In step S4, the base transceiver station BTS receives said TPC bits sent for each time unit. Furthermore, a predetermined number w of said TPC bits, i.e. TPC bits of a predetermined number w of subsequent time units are stored.
20 When reaching the predetermined number w, in step S5, a power raise during the recent w time units is calculated. This power raise can be determined for example by summing the TPC bits. Then, in step S6, also an received average power of transmission (e.g. indicated in dB) is calculated
25 during said w time units by using the TPC bits. The calculation of the average power can be performed, for example, as follows: In the beginning of a calculation period, the power (i.e. the signal strength) has an value of e.g. 10 dBm. When in the calculation period TPC bits -1,
30 +1, +1, +1 are sent, the average power is calculated by

$$\text{average power} = ((10-1)+(10-1+1)+(10-1+1+1)+$$
$$+(10-1+1+1+1))/4 = 42/4 \text{ [dBm]}.$$

In step S7, it is decided by using said calculated power
35 raise and average power of transmission during the w time units, whether the power raise is higher than a sum of the

average power and a predetermined level L. Said
predetermined level L is given for example in dB.

5   If the decision in step S7 is positive, i.e. the power
raise for said w time units is at least L dB higher than
the average power, a increase of the transmission power is
inhibited (step S8). That means, the transmission power
used by the base transceiver station BTS to the terminal
device TD is kept constant or is even decreased, even if an
10   increase was requested.

On the other hand, if the decision in step S7 is negative,
i.e. the power raise during said w time units is not L dB
higher than the average power, a power raise is allowed,
15   i.e. the transmission power can be increased (or decreased)
by the base transceiver station (step S9) as requested. The
transmission power sent by the base transceiver station is
increased (or decreased) according to the sum of all TPC
bits received during all w time units (e.g. +3).
20   Optionally, the transmission power may only be increased
(or decreased) according to the most recent requested power
raise (i.e. only the last received TPC bit, for example +1,
is taken into account). The decision, in which way of the
above described cases the power is changed, may be
25   depending on the respective application.

In step S10, the power control method is restarted.

With reference to FIG. 2, a device adapted to perform a
30   power control method according to the present invention is
described below.

When the communication between terminal devices TD via at
least one base transceiver station BTS (and probably other
35   network elements) starts, the received signal strength
(i.e. the transmission power used for the communication) is

monitored frequently and periodically at each time unit by a monitoring means 10. A requesting means 20 requests an increase or a decrease of the transmission power used by the base transceiver station BTS depending on results of

5   said monitoring means 10. For this purpose a TPC bit having a value of +1 or -1 is sent each timeslot as command data from the terminal device TD to the base transceiver station BTS.

10   Said TPC bits are received by a receiving means 30, for example at the base transceiver station, to be stored in a storing means 40. Said storing means 40 is adapted to store at least a predetermined number w of TPC bits (TPC bits of w time units or timeslots). When the predetermined number w

15   of TPC bits is reached, a calculating means 50 calculates the power raise and the average power using the stored TPC bits during said w time units as described above.

In a deciding means 60 it is decided whether the calculated

20   power raise is greater than the sum of the average power and the predetermined level L.

Depending on the result of said deciding means 60 an output means 70 outputs a power change signal which inhibit a

25   transmission power change by the base transceiver station BTS in the case that the power raise is at least L dB higher than the average power. On the other hand, in the case that the power raise is not L dB higher than the average power, a power change signal is output to allow a

30   increase (or decrease) of power by the base transceiver station BTS as requested.

A proposal for parameters w and L are w = 16 ... 64 and L = 1 dB ... 3 dB. However, other parameter values can be

35   used depending on for example user specific or connection type specific specifications.

By using the above described downlink power control it is
possible to reach of several dB in comparison to the
conventional power control. The reached gain depends also
5   on the connection type, e.g. outdoor to indoor channel,
single path channel etc. In case that there are only few
multipaths, the gain is the highest. It is possible to
reach a 20% gain in capacity in comparison to the previous
known methods in the system level.
10

As a second embodiment, the above described method and
device can also be used in uplink direction, i.e. in power
control for signaling from the terminal device TD to the
base transceiver station BTS. In this case, the signal
15   strength from the terminal device TD is monitored by the
base transceiver station. The further steps of storing,
calculating, comparing/deciding and outputting (steps S4 to
S9) and the corresponding means 30 to 70 may then be
implemented also in the base transceiver station BTS or in
20   the terminal device TD. In case of the uplink power
control, the method for example is based on received signal
to interference ratio (SIR) values which represent the
difference between a „wanted" signal and an interfering
signal.
25

It is to be noted that the present invention can be
implemented as hardware and/or software in the terminal
device and/or the base transceiver station. The present
invention can be used preferably in WCDMA systems during a
30   packet data communication, but also in any other CDMA
system (for example IS-95, cdma2000 etc.) during any data
communication (speech, packet data and the like).

Furthermore, the calculation (and therefore the decision
35   whether to allow or to prevent a power raise) can be done
timeslot per timeslot. Alternatively, it is also possible

to use more timeslots or time units (i.e. TPC bits) for the
calculation of the power raise and the average power.

The present invention proposes a method for controlling a
5   power used for transmitting data between a terminal device
TD and a transceiver device BTS of a communication system,
said method comprising the steps of monitoring S2 during a
predetermined time unit the power used in a transmission
between said terminal device TD and said transceiver device
10 BTS, requesting S3 an increase or a decrease of the power
used in the transmission by using a specific information
element TPC for each predetermined time unit, storing S4 a
predetermined number w of said specific information
elements TPC, calculating S5, S6 a first value and a second
15 value concerning the power of transmission during said
predetermined number w of said specific information
elements TPC, and deciding S7 by using the first value and
the second value concerning the power calculated in said
calculating step S5, S6, whether the first value concerning
20 the power is greater than a sum of the second value
concerning the power and a predetermined level L. The
present invention also proposes a corresponding device.

It should be understood that the above description and
25 accompanying figures are merely intended to illustrate the
present invention by way of example only. The preferred
embodiments of the present invention may thus vary within
the scope of the attached claims.

30

CLAIMS

1. A method for controlling a power used for transmitting
data between a terminal device (TD) and a transceiver
device (BTS) of a communication system, said method
comprising the steps of:

monitoring (S2) during a predetermined time unit the
power used in a transmission between said terminal device
(TD) and said transceiver device (BTS),

requesting (S3) an increase or a decrease of the power
used in the transmission by using a specific information
element (TPC) for each predetermined time unit,

storing (S4) a predetermined number (w) of said
specific information elements (TPC),

calculating (S5, S6) a first value and a second value
concerning the power of transmission during said
predetermined number (w) of said specific information
elements (TPC), and

deciding (S7) by using the first value and the second
value concerning the power calculated in said calculating
step (S5, S6), whether the first value concerning the power
is greater than a sum of the second value concerning the
power and a predetermined level (L).

2. A method according to claim 1, wherein said
predetermined time unit is a timeslot.

3. A method according to claim 1, wherein said
predetermined time unit is a frame composed of a plurality
of timeslots.

4. A method according to claim 1, wherein each one of said
specific information elements (TPC) used in each
predetermined time unit is either -1 indicating a request

for a decrease of power or +1 indicating a request for an increase of power.

5. A method according to claim 1, wherein said first value
5   concerning the power represents a power raise for said predetermined number (w) of said specific information elements (TPC) and said second value concerning the power is an average power for said predetermined number (w) of said specific information elements (TPC).
10

6. A method according to claim 5, further comprising the steps of:
    if the decision in said deciding step (S7) is positive, inhibiting (S8) a power raise due to a request
15   for increase the power in said requesting step (S3), and
    if the decision in said deciding step (S7) is negative, allowing (S9) a power raise due to a request for increase the power in said requesting step (S3).

20   7. A method according to claim 1 to 6, wherein said method is performed by at least one of said terminal device (TD) and said transceiver station (BTS).

8. A method according to claim 1 to 6, wherein said method
25   is performed in downlink direction.

9. A method according to claim 1 to 6, wherein said method is performed in uplink direction.

30   10. A device for controlling a power used for transmitting data between a terminal device (TD) and a transceiver device (BTS) of a communication system, said device comprising:
    monitoring means (10) for monitoring during a
35   predetermined time unit the power used in a transmission

between said terminal device (**TD**) and said transceiver
device (**BTS**),

   requesting means (**20**) for requesting an increase or a
decrease of the power used in the transmission by using a

5 specific information element (**TPC**) for each predetermined
time unit,

   storing means (**40**) for storing a predetermined number
(**w**) of said specific information elements (**TPC**),

   calculating means (**50**) for calculating a first value

10 and a second value concerning the power of transmission
during said predetermined number (**w**) of said specific
information elements (**TPC**), and

   deciding means (**60**) for deciding (**S7**) by using the
first value and the second value concerning the power

15 calculated by said calculating means (**50**), whether the
first value concerning the power is greater than a sum of
the second value concerning the power and a predetermined
level (**L**).

20 11. A device according to claim 10, wherein said
predetermined time unit is a timeslot.

12. A device according to claim 10, wherein said
predetermined time unit is a frame composed of a plurality

25 of timeslots.

13. A device according to claim 10, wherein each one of
said specific information elements (**TPC**) used in each
predetermined time unit is either -1 indicating a request

30 for a decrease of power or +1 indicating a request for an
increase of power.

14. A device according to claim 10, wherein said first
value concerning the power is a power raise for said

35 predetermined number (**w**) of said specific information
elements (**TPC**) and said second value concerning the power

is an average power for said predetermined number (w) of said specific information elements (TPC).

15. A device according to claim 10, further comprising an
5 output means (70) for outputting a signal adapted to
inhibit a power raise due to a request for increase the power made by said requesting means (20) if said deciding means (60) decides that the first value concerning the power is greater than the sum of the second value
10 concerning the power and the predetermined level (L), or
allow a power raise due to a request for increase the power made by said requesting means (20) if said comparing means (60) decides that the first value concerning the power is not greater than the sum of the second value
15 concerning the power and the predetermined level (L).

16. A device according to claim 10 to 15, wherein said device is included by at least one of said terminal device (TD) and said transceiver station (BTS).
20

17. A device according to claim 10 to 15, wherein said device is adapted to perform a power control in downlink direction.

25 18. A device according to claim 10 to 15, wherein said device is adapted to perform a power control in uplink direction.
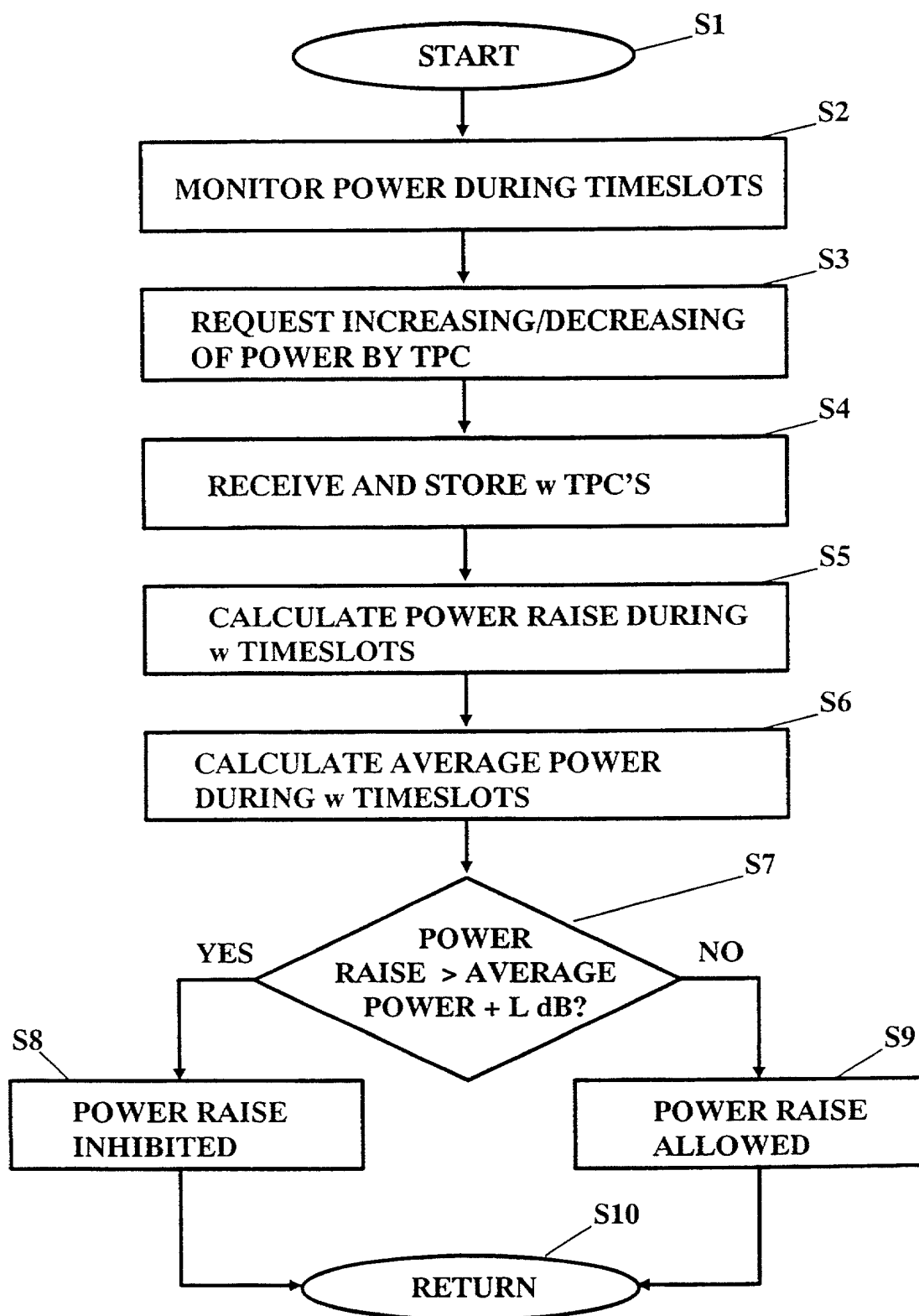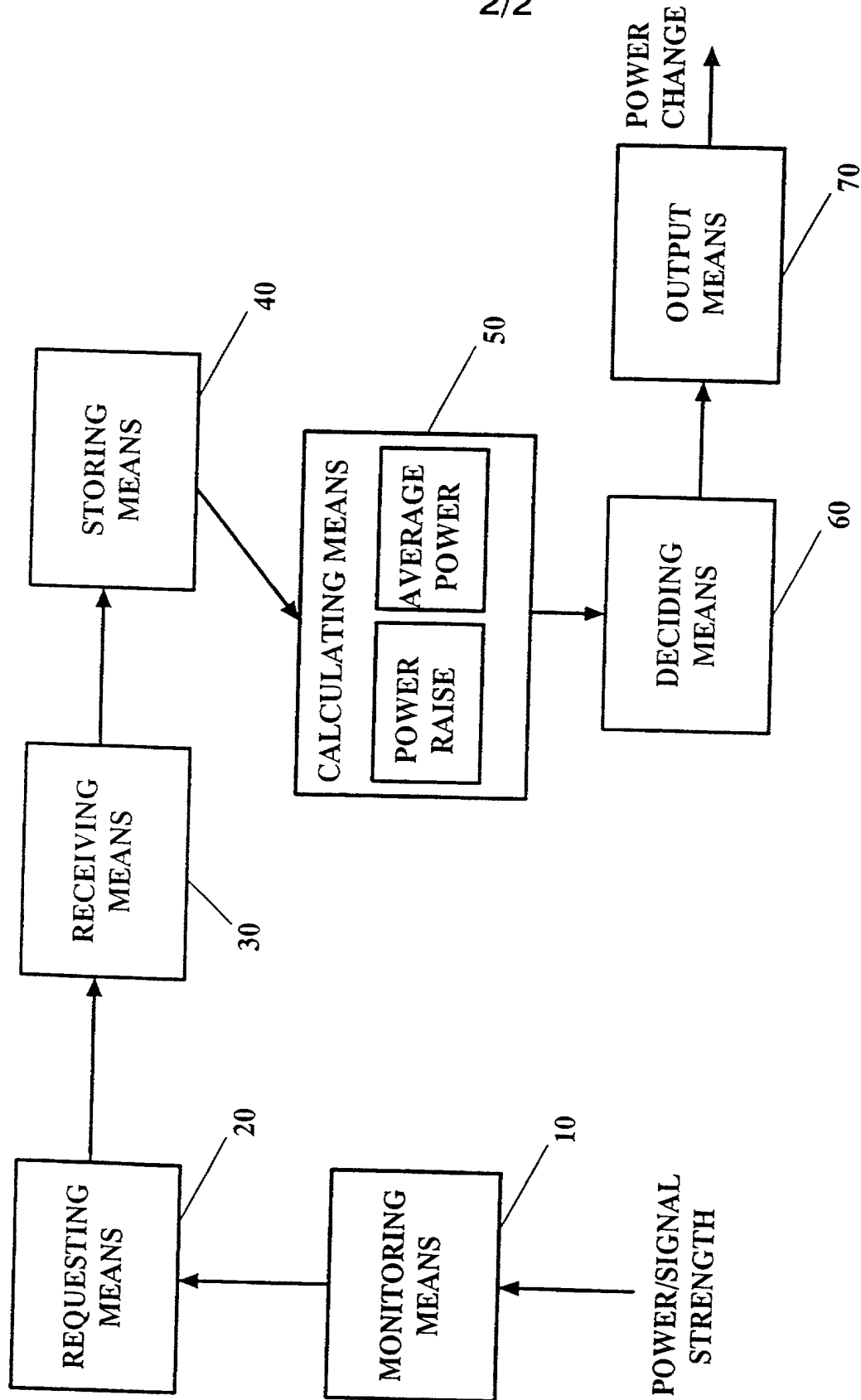
FIG. 1

FIG. 2

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY Includes Reference to PCT International Applications	Attorney's Docket No.**4925-187PUS**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

POWER CONTROL METHOD AND DEVICE

the specification of which (check only one item below)

[] is attached hereto

[] was filed as United States application

Serial No. _

on _

and was amended

on _ (if applicable).

[x] was filed as PCT international application

Number PCT/EP99/04495

on 29 June 1999

and was amended under PCT Article 19

on _ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of the application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

PRIOR FOREIGN/PCT APPLICATIONS AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

Country (if PCT, indicate "PCT")	Application Number	Date of Filing (day, month, year)	Priority Claimed Under 35 U.S.C. 119	
			[] YES	[] NO
PCT	PCT/EP99/04495	29 June 1999	[x] YES	[] NO
			[] YES	[] NO
			[] YES	[] NO
			[] YES	[] NO
			[] YES	[] NO
			[] YES	[] NO

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (check one)		
U S APPLICATION NUMBER	U.S FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO	PCT FILING DATE	U S. SERIAL NUMBERS ASSIGNED (if any)			
PCT/EP99/04495	29 June 1999			X	

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (*List name and registration number*)

MYRON COHEN, Reg. No. 17,358; THOMAS C. PONTANI, Reg. No. 29,763; LANCE J. LIEBERMAN, Reg. No. 28,437; MARTIN B. PAVANE, Reg. No. 28,337; MICHAEL C. STUART, Reg. No. 35,698; KLAUS P. STOFFEL, Reg. No. 31,668; EDWARD WEISZ, Reg. No. 37,257; VINCENT M. FAZZARI, Reg. No. 26,879; JULIA S. KIM, Reg. No. 36,567; ALFRED FROEBRICH, Reg. No. 38,887; ALFRED H. HEMINGWAY, JR , Reg. No. 26,736; KENT H. CHENG, Reg. No. 33,849; YUNLING REN, Reg. No. 47,019; ROGER S. THOMPSON, Reg. No. 29,594; BRICE FALLER, Reg. No. 29,532; DAVID J. ROSENBLUM; Reg. No. 37,709; TONY CHEN, Reg. No. 44,607; ELI WEISS, Reg. No. 17,765.

Send correspondence to:
Michael C. Stuart
Reg. No. 35,698
Cohen, Pontani, Lieberman & Pavane
551 Fifth Avenue, Suite 1210
New York, New York 10176

Direct Telephone calls to:
(name and telephone number)
Michael C. Stuart
(212) 687-2770

201	FULL NAME OF INVENTOR	FAMILY NAME RAITOLA	FIRST GIVEN NAME Mika	SECOND GIVEN NAME
	RESIDENCE, CITIZENSHIP	CITY Masala	STATE OR FOREIGN COUNTRY Finland	COUNTRY OF CITIZENSHIP Finland
	POST OFFICE ADDRESS	POST OFFICE ADDRESS Nissnikuntie 7 B 5	CITY Masala	STATE & ZIP CODE/COUNTRY FIN-02430 Finland
202	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE, CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

Combined Declaration for Patent Application and Power of Attorney (Continued) (Includes Reference to PCT International Applications)				Attorney's Docket No. 4925-187PUS
2 0 3	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE, CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
X		
DATE 7. 1, 2002	DATE	DATE

U.S. DEPARTMENT OF COMMERCE Patent and Trademark Office